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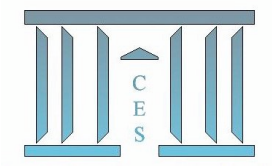

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Live or Let Die: Intra-Sectoral Lobbying on Entry *

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Abstract

Since the GATT/WTO hinders tariffs manipulation, the Technical Barriers to Trade (TBT's) are a growing and appealing protection tool. The endogenous protection literature has shown that a government's taste for protection creates an incentive for lobbying. Since regulations at the origin of such barriers have to be borne also by domestic sectors, due to the National Treatment WTO's principle, this creates conflicts of interests within a sector enhancing an intra-sectoral lobbying competition. This paper develops a political economy framework based on common agency under complete information that highlights this issue. The political competition opposes productive versus non productive firms in this context rather than domestic versus foreign ones, contrasting with the literature. Some apparently unorganized sectors, i.e that are not protected, may actually be sectors where lobbies are biased towards non productive firms. Therefore, we should be cautious when empirically studying the relationship between the levels of protection and contributions.

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Key-words : Endogenous protection, Truthful equilibrium, Firm heterogeneity

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1 Introduction

> *"When asked why free trade is so often preached and so rarely practiced, most international economists blame "politics". In representative democracies, governments shape trade policy in response not only to the concerns of the general electorate, but also to the pressures applied by special interest."* (Grossman and Helpman 1994).

An important question for theoretical and applied research in international economics is related to the difficulty of implementing free trade. In a seminal paper that encompasses the main mechanisms of the *New Political Economy*, Grossman and Helpman (1994) (henceforth GH) have proposed a clear-cut model of lobbying (the "Protection For Sale" model, hereafter the PFS model) that provides the microfoundations to the political motives for protection. They show how a policy maker's affinity for private gains leads him to design protectionist trade policies against unorganized population. In this context, trade policy is understood in the most common way as a vector of tariffs and subsidies that a government implements to protect some domestic industries. An important literature has emerged following this paper, which has been extended to study the political economy of Free Trade Agreements (FTA) (Ornelas, 2005; Grossman and Helpman, 1995, among others) and the endogenous formation of lobbies (Bombardini, 2008; Mitra, 1999). On the empirical side, Goldberg and Maggi (1999) have pioneered a literature focusing on the empirical validity of the PFS model (see Gawande and Bandyopadhyay (2000), Bombardini (2008) and more recently Imai *et al.* (2008)).

However, the nature of the trade policy instrument has not been questioned in the literature. Yet, the tremendous decrease of tariff barriers throughout GATT and WTO negotiations over the past 60 years renders unilateral tariffs manipulation extremely difficult. Moreover, the creation of the Dispute Settlement Body (DSB) associated to the WTO hinders permanent deviations from negotiated tariff levels. One consequence is that current negotiations at the WTO now focus on the increasing role of non tariff barriers (NTBs) and technical barriers to trade (TBTs) to lower trade frictions. These NTBs dramatically lack of transparency, which makes WTO much

less operative to resolve disputes related to such protection.[1]

In addition, the recent literature in international trade has put forward two sources of trade growth (see Bernard *et al.* (2003), Melitz (2003), Chaney (2008)): the decrease in per unit trade costs through the reduction of tariffs and transport costs and the decrease of sunk costs associated with production and export. As a result of the reduction of these sunk costs, economies are more integrated. It thus seems reasonable that protectionist policies should also consist in manipulating these sunk costs rather than tariffs. Moreover, sunk costs heavily depend on the regulations and standards applied in a country and thus directly depend on government's decisions. At least part of these sunk costs are directly related to TBTs.[2]

In this paper, we study the incentive for policy makers to implement new regulations and standards that increase sunk costs associated with production for a protectionist motive. To that purpose, we adapt the lobbying model of GH, based on the common agency game under complete information first developed by Bernheim and Whinston (1986) (henceforth BW), in order to determine the underlying political motives and how they differ from those that arise with implementation of tariffs, as in the PFS framework.

Considering these regulations and standards as a protection tool raises some new questions. The implementation of a standard cannot only be applied to foreign competitors but must also be applied to domestic producers. As stated by the national treatment principle of the WTO, a country cannot grant a preferential treatment to domestic firms compared to their foreign counterparts. The reasons for a positive demand of TBTs from domestic producers are therefore not obvious. While these regulations raise the cost of all producers, the literature often refers to these standards and regulations as protectionist policies in the sense that they might raise more the cost of foreign producers than the cost of domestic producers in some cases. This protects domestic producers from the competition of foreign producers, as long as we consider that firms

[1] See for example Horn and Weiler (2004) on the WTO dispute concerning the French regulation on asbestos. They show the inherent ambiguity surrounding the question of the appreciation of the effects and the purposes of such socially beneficial regulation.

[2] Trade literature generally see these sunk costs as a combination of costs associated with collecting informations on export market, launching a distribution network, but also with meeting country specific standards and norms, i.e. our interpretation of TBTs.

are identical. However, if we consider in addition that firms differ in size, these regulations generate another effect *among* domestic producers. Indeed, since the least efficient domestic producers cannot bear these additional costs, they are forced to exit, leaving their market shares to the most efficient producers that therefore may benefit from the implementation of a TBT. It is important to notice that this effect is at work even in the absence of *any* competition from abroad.

To highlight this issue, we consider a closed economy framework, postponing the discussion on the consequences of a TBT implementation in a small open economy framework (as in the PFS framework) to the end of this paper. This simplifying assumption allows us to concentrate on the potential intra-sectoral conflicts of interests among domestic producers within a defined industry.

In order to focus on the political determinants of such regulations, we also assume that they have no enhancing effect on social welfare. Suppressing any positive welfare effect allows to shed a light on the way these regulations may be turned away from their "official" social objective. Since there is no social interest in the implementation of a new regulation in our model, the unique explanation for any regulation would be based on the political influence of lobbies. In the following, we will thus refer to this kind of regulations as an entry tax, since the sole effect is an additional fixed cost for firms.[3] Following the PFS framework, we will assume that a government that has public and private concerns receives contribution schedules of all active lobbies in the economy. The government then chooses the level of the endogenous variable that maximizes its objective function. The difference between the PFS framework and ours is therefore the decision variable of the government.

Our main contribution is to show that this new policy instrument shifts the competition between active lobbies from an inter-sectoral to an intra-sectoral competition, which brings new insights on the determinants of competition among lobbies. Indeed, the core mechanism that we want to put forward in order to explain the conflicts of interests among lobbies is based on

[3]Allowing these regulations to affect also the variable cost would not alter our qualitative results.

a profit shifting effect from small unproductive firms towards large productive firms, *within* a defined industry. This result has to be opposed to the conflicts of interests between national and foreign firms that arise under manipulation of tariffs. One other interesting aspect of this new type of competition is that it gives a rationale for the existence of producer unions formed on a firm's size basis and not on a sectoral basis.[4]

Finally, we claim that the present contribution also raises a new issue from an empirical perspective. The wide literature aiming at testing empirically the relevance of the PFS model has extensively used protection measures mainly constructed on NTBs coverage ratios (Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000; Bombardini, 2008; Imai *et al.*, 2008). These authors often argue that this kind of trade barriers is well suited for their analysis because of the difficulty for governments to manipulate tariffs relatively to NTBs, which is precisely our motivation to study the lobbying incentive over TBTs.[5] Our model makes clear that the motives to "protect" industries with TBTs greatly differ from those with tariffs, which lead to be cautious with protection measures based on NTBs coverage ratios that potentially take into account some cost creating regulations.[6] We show that organized sectors (i.e. sectors with active lobbies) may contribute for the *non* implementation of TBTs, which is at odds with the empirical tests, since the prediction of the PFS model is that politically organized industries should benefit from a higher protection than unorganized ones, given the import penetration ratio.

In the last section of this paper, we discuss the straightforward extension of our framework to a small open economy. The main prediction is that organized sectors would lobby for the implementation of TBTs *only if* the average productivity of foreign suppliers is lower than that

[4]For instance, large french firms founded the Assocation des Grandes Entreprises Francaises (AGREF) in 1967, which is not a representative organization but rather a corporate think tank based on firm's size.

[5]Bombardini (2008): *"Although the model deals with tariffs, there are two reasons to use NTBs in the empirical analysis. First, tariffs are low and the use of instruments such as anti-dumping, countervailing duties and tariff rate quotas are on the rise. Second, interest groups are aware that NTBs are easier for a country to manipulate unilaterally, as opposed to tariffs, which are set through multilateral rounds of negotiations."*

[6]Papers using NTBs coverage ratio as a proxy for the level of protection often give examples of NTBs that could be easily compared to tariffs (quotas, VER, countervailing duties). However, they use the UNCTAD data base (TRAINS) on trade control measures. This data base also make a census of "technical measures" (code: 8000), that are clearly TBTs. In these papers, it is unclear if they exclude this type of NTBs in their NTBs coverage ratio computation.

of domestic producers. If it is not the case, domestic lobbies would influence the government so as *not* to implement any TBT, because the induced profit shifting effect would favor foreign suppliers at the expense of domestic producers. The level of protection in organized industries thus does not only depend on the import penetration ratio, but also on the average productivity of foreign suppliers.

The remainder of this paper is organized as follows. In section 1, we describe the structure of our simple economy. In section 2, we show the way the implementation of an entry tax generates conflicts of interest among domestic producers. We detail the political game and the properties of the equilibrium in section 3. In section 4, we examine the determinants of the competition among lobbies. In section 5, we discuss how our results could be extended to a small open economy and how a given entry tax level could endogenously promote lobby formation. Section 6 concludes.

2 Model Setup: The Economic Structure

Our model describes a static closed economy. The simple extensions of our results to a small open economy are relegated in section 5.1.

We assume two sectors: M and A. Labour (L) is the only factor of production. The M sector is characterized by increasing returns to scale in the production of a continuum of varieties and is subject to monopolistic competition *à la* Dixit-Stiglitz. The A sector produces a homogeneous good under perfect competition and constant returns to scale, and serves as a numeraire. Firms are owned by workers.

Demand

The preferences of a representative consumer are depicted by a quasi-linear utility function U, with a CES sub-utility function over the continuum of manufacturing varieties:

$$U = A + \mu \ln C_M \qquad C_M = \left(\int c_i^{1-\frac{1}{\sigma}} \right)^{\frac{1}{1-\frac{1}{\sigma}}} \text{, with } \sigma > 1 \tag{1}$$

C_M and A denote consumption for the M composite good and the numeraire good, respectively. σ is the constant elasticity of substitution between any two varieties and μ the preference parameter over manufactured goods.

The maximization of the representative consumer utility yields the following demand for variety i:

$$c_i = \frac{\mu L}{\int_{h\in\Theta} p_h^{1-\sigma} d_h} p_i^{1-\sigma} \tag{2}$$

where p_i is the price of variety i, Θ being the set of all available varieties h in this economy. We normalize labor endowment such that $L = 1$.

Production

The numeraire good (A) is produced with one unit of labor per unit of output and without loss of generality, we normalize the wage rate to one.

Any active firm i in the M sector bears a fixed overhead production cost F, which could reflect the costs implied by the legal system and standards in force in the country, and a constant marginal production cost a_i. The cost of producing q units of good i with marginal cost a_i is thus: $C_i(q) = a_i q + F$. Given the demand function (2), the optimal price charged by a firm i is a constant mark-up over its marginal cost. Hence, a firm whose marginal cost is a_i will charge price $p_i = \frac{\sigma}{\sigma-1} a_i$. It follows that profits of a firm with marginal cost a_i are:

$$\pi_i = \frac{\mu}{\sigma} \left(\tfrac{\sigma}{\sigma-1}\right)^{1-\sigma} P^{\sigma-1} a_i^{1-\sigma} - F \tag{3}$$

where $P = \left(\int_{j\in\Theta} p_j^{1-\sigma} dj\right)^{\frac{1}{1-\sigma}}$ is the perfect price index.

Firm heterogeneity

As informally explained in the introduction, the potential conflicts of interest within a sector with respect to the implementation of an entry tax are due to the presence of firms that differ in size and productivity. Following this consideration, we assume that firms differ in their productivity. While our qualitative results do not depend on a specific distribution of productivity among firms, we assume here that firms' marginal costs are drawn from a Pareto distribution.

This assumption is motivated first because it allows to get analytical results that foster intuition. More importantly, even if our qualitative results would hold with any distribution, the Pareto distribution has the convenient feature that we will make explicit below, that the sum of profits of all firms in this economy is independent of the number of active firms as well as the level of the entry tax. It thus allows to focus on a specific case where the motive for lobbying *exclusively* comes from a "profit shifting" effect.

Specifically, we assume that marginal costs a are comprised between 0 and a_0, and that these marginal costs are drawn from a Pareto distribution $F(a)$ with a shape parameter κ such that

$$F(a) = \left(\frac{a}{a_0}\right)^{\kappa}, \text{ with } 0 < a < a_0 \tag{4}$$

We further define $x_i \equiv a_i^{\sigma-1}$. We can define the ratio of two firms revenues by:

$$\frac{r(x_1)}{r(x_2)} = \frac{x_2}{x_1} \tag{5}$$

where x may be understood as an index of the inverse of firm size. Indeed, this index perfectly follows the inverse of the firm size distribution in our economy. In the following, we will refer to x_i as the efficiency index of firm i.

We will thus consider x rather than a and assume that x is drawn from a Pareto distribution $G(x)$, with a shape parameter $\rho > 1$.[7]

$$G(x) = \left(\frac{x}{x_0}\right)^{\rho}, \text{ with } x > 0 \tag{6}$$

Without loss of generality, we normalize $x_0 = 1$. Finally, since our framework is static, we assume as in Chaney (2008) that there is a group of entrepreneurs proportional to country size. Hence, the total mass of entrants is proportional to L.[8]

Equilibrium

[7] It can be easily shown that $\rho = \frac{\kappa}{\sigma-1}$, which ensures that the standard regularity condition is satisfied: $\kappa - (\sigma - 1) > 0$, when $\rho > 1$

[8] Recall that it is normalized to 1.

The profit of firm i is given by:

$$\pi_i = \frac{\mu}{\sigma \int p_i^{1-\sigma}} p_i^{1-\sigma} - F \tag{7}$$

The computation of the price index ultimately depends on the efficiency index of the least efficient firm able to enter the market, since all firms with an x below this threshold are active in this market and make positive profits. Let x_E denote the index of the least efficient active firm (E for entry). We compute the price index with respect to x_E:

$$\int_0^{x_E} p\left(x\right)^{1-\sigma} G(x)dx = \left(\tfrac{\sigma}{\sigma-1}\right)^{1-\sigma} \lambda x_E^{\rho-1} \quad \text{with} \quad \lambda \equiv \tfrac{\rho}{\rho-1}$$

To get the simplest possible benchmark (i.e. without any lobbying activity), we further normalize the efficiency index of the least efficient active firm to one, i.e. $x_E = 1$. This last normalization pins down the value of the fixed production cost F:

$$F = \frac{\mu}{\sigma\lambda}$$

In this very simple economy, firms first observe their efficiency index drawn from the specified distribution $G(x)$ and then decide whether to produce or not. All the firms with an efficiency index $x_i < x_E$ are able to cover the fixed cost F with their operational profits and thus decide to produce and make pure profits. Conversely, all the firms with an efficiency index $x_i > x_E$ do not enter the market, as they would make negative profits in that case. In our benchmark case, we have normalized the total mass of active firms to 1.

3 Lobbying on tax entry

Any change in the level of the fixed cost F affects the number of active firms in equilibrium. A marginal increase of F indeed forces the least efficient firms to exit the market. We suppose that any additional fixed entry cost to our benchmark reflects the implementation of a new regulation

or standard producers have to comply with. However, our interpretation is rather restrictive since we assume no positive social effect from the implementation of new standards.

There are some reasons to suppose that new standards can be beneficial. For instance, some new standards such as sanitary or environmental regulations might increase aggregate social welfare by reducing the size of some negative production externalities. These possible positive effects make these regulations potentially desirable from a social perspective and may thus generate a social demand for these new regulations. However, we want to focus here on the private motives to implement such new regulations. In order to make these new motives explicit in our analysis, we assume away any positive effect from an increase in the fixed cost firms have to pay, which thus does not affect consumers' utility. We will therefore refer to the implementation of such policy as the implementation of an entry tax for firms, since their only effect is to increase the fixed cost of all active firms. By suppressing their social desirability, it may seem that the incentives to promote these regulations are off as they hinder entry and thus competition. We however argue that there are still some private incentives to lobby for the implementation of new regulations. Many individual producers complain about these regulations because of their capacity to hinder entry. We show that what is denounced by some producers is the reason why some others promote such policies.[9]

Before turning to the political game itself, we first present the consequences of an increase in the fixed cost of production on the market structure of our simple economy, to highlight how this generates conflicts of interest among producers and a reason for some of them to lobby for the implementation of new entry taxes.

[9]Examples of TBTs that recover our definition of an entry tax include the necessary administrative steps to create a firm, to obtain the authorization to sell a product. The recent European decree called REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) now forces *all* firms within the chemical industry to pay for the necessary tests to sell their products. We have implicit evidence that large firms did not lobby against this decree (for instance, Total claims that it has anticipated this decree) while we have clear evidence that many small firms did (in France, they are gathered in a sector union, the UIC).

3.1 Impact of setting an entry tax: intra-sectoral conflicts of interest

Formally, we assume that the implementation of an entry tax raises the fixed cost of entry by an amount of βF, such that any active firm has to pay a total fixed cost of $(1+\beta)F$. The crucial variable in this model and the only endogenous instrument for a policy maker is thus β. The larger β is, the more stringent the regulation.

Here, we develop the intuition of the conflicts of interests among producers that arise when an entry tax is set-up. First, an additional fixed cost reduces the profitability of all firms. On the one hand, this lower profitability forces the least efficient firms to exit the market since they would make negative profits in this situation. On the other hand, the most efficient firms may be competitive enough to make positive profits. The impact of the entry tax on these firms is thus ambiguous. Their profits are reduced by the larger entry cost. But market competition is weakened since some less efficient firms are forced to exit. This effect increases the market shares and profits of all firms that are able to bear the larger entry cost. Importantly, this second effect may be larger than the first one for the most productive firms. As a consequence, the implementation of an entry tax leads to a profit shifting effect from small to large firms, compared to the benchmark case where β is equal to 0.

The implementation of a positive entry tax splits the mass of firms into three groups. The first group is composed of firms that are forced to exit the market. The second is composed of firms that can bear the larger entry cost but make smaller profits than in the benchmark case. For these firms, the first effect of the entry tax overcomes the second one. Finally the last group is composed of firms that make larger profits. For this last group, the second effect of the tax entry outweighs the first one.

We now turn to the formal definition of these three groups in our setting with respect to β and the induced profit shifting effect.

Suppose that a tax entry is set-up which raises the entry fixed cost to $(1+\beta)F$. The profits

of an active firm i thus becomes:

$$\pi_i = \frac{\mu}{\sigma\lambda\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} x_E^{\rho-1}} p_i^{1-\sigma} - (1+\beta)\,F \tag{8}$$

It is straightforward to determine the efficiency index (x_E) of the least efficient firm able to be active in this market. All firms characterized by a $x_i > x_E$ exit the market and compose the first group of firms. The "new" least efficient firm makes no pure profits. Its operational profits are just sufficient to cover the entry fixed cost $(1+\beta)\,F$. This allows to define x_E:

$$\pi_{_E} = \frac{\mu}{\sigma\lambda x_E^{\rho-1}} x_E^{-1} - (1+\beta)\,F = 0 \tag{9}$$

$$\Leftrightarrow x_E = (1+\beta)^{-1/\rho} < 1 \tag{10}$$

The firm that makes exactly the same profits with or without the entry tax defines the separation between both remaining groups. We call the efficiency index of this "indifferent" firm x_C (C for contribution). Formally, x_C is given by:

$$\Delta\pi_{x_C} = \pi_{x_C}^{\beta>0} - \pi_{x_C}^{\beta=0} = 0 \tag{11}$$

$$\Leftrightarrow x_C = \beta^{-1}\left((1+\beta)^{\frac{\rho-1}{\rho}} - 1\right) \tag{12}$$

The conflicts of interests among producers induced by the entry tax generates however only two groups of firms. One is composed of firms that are hurt by the new regulation (firms between x_C and $x_i = 1$) and those that benefit from it (i.e. $x_i < x_C$). In order to assess the extent of conflicts of interests among producers, we next evaluate the profit shifting induced by the entry tax.

One convenient aspect of the quasi-linear utility function is that the total amount of expenditure spent over manufactured goods is constant and does not depend on consumer income. As a result, market shares lost by small firms are exactly equal to market shares won by large

firms. Besides, the Pareto distribution induces the particular (and convenient) feature that the sum of entry fixed costs saved due to the non entry of some small firms is exactly equal to the extra fixed entry costs paid by the remaining active firms. Consequently, the sum of pure profits in this economy is constant, no matter the level of the tax entry implemented. To show this, we compute the sum of all pure profits with respect to x_E (and thus with respect to β). The aggregate pure profit in this sector is independent of β:

$$\int_0^{x_E} \pi(x)G(x)dx = \frac{\mu}{\sigma\lambda}\frac{1}{x_E^{\rho-1}}\int_0^{x_E} x^{-1}G(x)dx - \int_0^{x_E}(1+\beta)\,FG(x)dx = \frac{\mu}{\sigma\rho} \tag{13}$$

This result ensures that the increased pure profits of some firms is exactly equal to the pure profit loss of all other firms, which allows to focus on a profit shifting effect as the unique reason for private producers to lobby for the implementation of an entry tax.

Lemma 1 *In this economy, the pure profit variation of any group of firms due to any entry tax is equal to the inverse of pure profit variation of all other firms.*

As a consequence, gains and losses of our two groups of firms can be summarized by computing the aggregate profit shifting in this sector with respect to β. This aggregate profit shifting shows how the conflicts of interest are stronger, the larger the entry tax, since this aggregate profit shifting is increasing in β. We label $\Delta\pi_i(\beta)$ the variation of firm i's pure profits from $\beta = 0$ to $\beta > 0$ and we get:

$$\sum_{i\in\Theta}\Delta\pi_i(\beta) = 0 \quad \forall\Theta \tag{14}$$

$$\sum_{i=0}^{i=x_C}\Delta\pi_i(\beta) = \frac{\mu}{\sigma\rho}\left((1+\beta)^{\frac{\rho-1}{\rho}}-1\right)^{\rho}\beta^{1-\rho} > 0 \tag{15}$$

4 The political game

In order to make a clear comparison with the results obtained by GH and to assess the differences between the implementation of an entry tax and a vector of tariffs, we keep the same framework they have used for the political game. We thus consider a common agency game under complete information, with transferable utility, where the decision of the agent (here the government) affects its well-being as well as the well-being of the L set of principals (here the lobbies), when each of whom offers a menu of payments contingent on the action chosen by the government. This kind of game has first been introduced and analyzed by BW and has been further developed to model strategic lobbying to influence trade policy formation by GH. This framework is thus well-suited to study the incentives to lobby for the new kind of trade barriers The aim is therefore to show how the properties of the equilibrium of this political game differ when studying a lobbying activity on an entry tax in a given sector with no specific inputs instead of a lobbying activity on tariffs in a multi-sector case with specific inputs, as in the PFS framework.

We first characterize each player, namely the government and the lobbies. We then present the equilibrium

4.1 Government

As standard in this literature, the government maximizes an objective function, namely G, composed by the aggregate social welfare and the contributions effectively paid by the exogenous L organized lobbies. The objective function is benthamite, which means that the government weights differently the social welfare and its private revenue. The coefficient "ϕ" is a measure of the relative weight of social welfare compared to private revenue. If $\phi \to \infty$, the government only cares about social welfare and is totally insensitive to influence or bribes. In contrast, if $\phi = 0$, the government only cares about its private revenue. The objective function of the government is thus given by:

$$G(\beta) = \sum_{j \in L} C_j(\beta) + \phi W(\beta) \tag{16}$$

Where $\sum_{j\in L} C_j(\beta)$ represents the sum of contributions paid by the L active lobbies. The aggregate social welfare ($W(\beta)$), gross-of-contributions, is standardly defined as the sum of the aggregate income, plus the entry tax revenues, plus consumer surplus:

$$W(\beta) = \left(\int_0^{x_E} \pi_i(\beta) + 1\right) + F\frac{\beta}{(1+\beta)} + \left(\mu \ln \mu - \mu + \frac{\mu}{\sigma-1} \ln \lambda \frac{\sigma}{\sigma-1} (1+\beta)^{\frac{1-\rho}{\rho}}\right) \tag{17}$$

According to Lemma 1, the sum of pure profits ($\int_0^{x_E} \pi_i(\beta)$) in this framework is constant and independent of β. The aggregate income, net of entry tax revenues, thus remains unaffected by the implementation of an entry tax. An entry tax has thus only two effects on the social welfare: first, an entry tax hinders entry for the least efficient firms, which reduces the number of varieties available for consumers and thus has a negative impact on consumer utility. Second, the entry tax revenues raise consumers' income and thus reduces the negative effect of the entry tax on consumers' utility and social welfare. However, it is important to notice that the first (negative) effect always outweighs the second (positive) one, i.e. $\frac{\partial W(\beta)}{\partial \beta} < 0$ for any $\beta > 0$. It follows that an entry tax always reduces the aggregate social welfare, and the larger the entry tax implemented is, the larger the welfare loss. Formally, from a pure social perspective, there is thus no reason to implement a positive entry tax in this very simple framework.

The government has a direct interest for social welfare but is also concerned by its private revenue (the lobbies' contributions). The government evaluates all lobbies' proposals included in their contribution schedules and finally chooses the entry tax level that maximizes its objective function $G(\beta)$, i.e. the entry tax that fits the best with its compromise between social and selfish concerns. Assuming that political contributions are differentiable around the equilibrium, this maximization implies that in equilibrium:

$$\sum_{j\in L} \frac{\partial C_j(\beta^*)}{\partial \beta^*} + \phi \frac{\partial W(\beta^*)}{\partial \beta^*} = 0 \tag{18}$$

where β^* denote the equilibrium value of the entry tax.

4.2 Lobbies

We assume that there are L exogenous organized lobbies. Any lobby j ($j \in L$) maximizes its objective function G_j, which is simply the sum of the joint welfare of the lobby members, $W_j(\beta)$, net of the contributions paid to the government, $C_j(\beta)$:

$$G_j = W_j(\beta) - C_j(\beta)$$

where $W_j(\beta)$ is defined in the same way as the aggregate social welfare:

$$W_j(\beta) = \left(\sum_{i \in j} \pi_i(\beta) + \alpha_j \right) + \alpha_j F \frac{\beta}{(1+\beta)} + \alpha_j \left(\mu \ln \mu - \mu + \frac{\mu}{\sigma - 1} \ln \lambda \frac{\sigma}{\sigma - 1} (1+\beta)^{\frac{1-\rho}{\rho}} \right)$$

The objective function of any lobby j is composed of a producer interest which depends on the composition of its ownership and a consumer interest that has the same shape for all active lobbies. α_j represents the fraction of the total population represented by lobby j and defines the relative weight of the producer and consumer interests in the lobby's objective function. No assumption is made on the type or the number of firms represented by lobby j. Indeed, since we assume that there is no specific factor of production, we have *a priori* no reason to gather some particular firms together into the lobby.[10]

As shown above, large firms have opposed interests to small firms over the implementation of an entry tax. However, the definition of large and small firms (given by $x_c(\beta)$), depends *in fine* on the level of the entry tax, which ultimately depends on the government's decision and cannot be given *ex ante*. Put differently, we first make no assumption on the shape of $\sum_{i \in j} \pi_i(\beta)$. It follows that $\sum_{i \in j} \pi_i(\beta)$ could be potentially strictly increasing, strictly decreasing or non-monotonic in β. This depends on the size of firms represented by lobby j. It is worth noting that this already contrasts with a tariff, since the producer interest of the lobby (represented by $\sum_{i \in j} \pi_i(\beta)$) is not necessarily strictly increasing in the level of the endogenous policy instrument considered, here the level of the entry tax.

[10]The last section of this paper discusses this (absence of) assumption.

In the next section where we study the equilibrium level of lobbies' contributions, we will assume some restrictions on $\sum_{i \in j} \pi_i(\beta)$ to foster intuition.

4.3 Equilibrium: Cannibalism and lobbying

In this simple setup, the incentive to lobby for the implementation of a positive entry tax only comes from the possibility for some large firms to absorb market shares of other smaller firms that would be forced to exit. Lobbies that are biased towards large firms would thus lobby for a positive entry tax, which creates a motive for lobbies biased towards small firms to propose contributions so as to make this entry tax as small as possible.

We refer to this mechanism as cannibalism since competition among lobbies arises *within* a given sector, which deeply contrasts with the convergence of interests of firms within sectors with respect to the implementation of a tariff.

4.3.1 Timing of events

The chronology of the game is the following. First, the efficiency index of each firm is drawn from the distribution $G(x)$. The L exogenous lobbies are then formed. The lobbying activity is perfectly free. Each lobby proposes a contingent monetary contribution (potentially zero) to the government for each possible level of the entry tax. This defines a contribution schedule. The equilibrium level of the entry tax (β^*) is then decided by the government. The government receives all contributions for the chosen level of β. To remain consistent with the PFS framework, we assume that the government finally pays back to consumers revenues induced by the implemented policy. Finally, firms which can enjoy positive profits produce.

4.3.2 Equilibrium

The equilibrium of this entry tax setting game is characterized by a set of conditions. The interpretation of these conditions is given below. We denote by L the set of all active lobbies in the sector and by Ξ the set of possible entry taxes.

BW have shown that the equilibrium of such a game characterized by:[11]

$\{C_j^*(\beta)_{j\in L}, \beta^*\}$ is a subgame-perfect Nash equilibrium of the tax entry-policy game if and only if:

(a) $C_j^*(\beta)$ is feasible for all $j \in L$.

(b) β^* maximizes $\sum_{j\in L} C_j^*(\beta) + \phi W(\beta)$ on Ξ

(c) β^* maximizes $\sum_{j\in L} C_j^*(\beta) + \phi W(\beta) + W_j(\beta) - C_j(\beta)$ on Ξ for every $j \in L$.

(d) for every $j \in L$ there exists a $\beta^j \in \Xi$ that maximizes $\sum_{i\in L} C_i^*(\beta) + \phi W(\beta)$ on Ξ such that $C_j^*(\beta^j) = 0$

Condition (a) ensures that contributions can be neither negative nor greater than the total income of lobby members. Condition (b) states that the government chooses the level of the entry tax β so as to maximize its own welfare given the contributions of all lobbies. Condition (c) states that the joint surplus of the government and lobby j is maximized at β^*, otherwise lobby j could modify its contribution schedule so as to increase the joint surplus and would retain a fraction of this increased surplus. Finally, condition (d) states that lobby j manages to extract all the available surplus from the government; it contributes just enough to provide the government with the same welfare it would achieve if lobby j were not participating in the political game.

Condition (c) implies that the following first-order condition is satisfied at β^*:

$$\sum_{j\in L} \frac{\partial C_j(\beta^*)}{\partial \beta^*} + \phi \frac{\partial W(\beta^*)}{\partial \beta^*} + \frac{\partial W_j(\beta^*)}{\partial \beta^*} - \frac{\partial C_j(\beta^*)}{\partial \beta^*} = 0 \tag{19}$$

Condition (b) further implies that the following first-order condition is also satisfied:

$$\sum_{j\in L} \frac{\partial C_j(\beta^*)}{\partial \beta^*} + \phi \frac{\partial W(\beta^*)}{\partial \beta^*} = 0 \tag{20}$$

[11] See Lemma 2 in BW.

Taken together, these two conditions lead to:

$$\frac{\partial C_j(\beta^*)}{\partial \beta^*} - \frac{\partial W_j(\beta^*)}{\partial \beta^*} = 0 \tag{21}$$

This equation establishes that the contribution schedules are locally truthful around the equilibrium entry tax β^*. Each lobby sets a contribution schedule such that the marginal change in its contribution around the equilibrium β^* perfectly offsets the effect of the policy change on the lobby's gross welfare. Finally, substituting equation (21) into (20) allows to get:

$$\sum_{j \in L} \frac{\partial W_j(\beta^*)}{\partial \beta} + \phi \frac{\partial W(\beta^*)}{\partial \beta} = 0 \tag{22}$$

This expression shows that the equilibrium of the game may be interpreted as the government maximizing the aggregate social welfare with weighting individuals represented by a lobby by a parameter $(1 + \phi)$ and the other unorganized individuals by a simple weight 1. This last equilibrium condition may be rewritten so as to isolate the total marginal gain and the total marginal loss of lobbying in equilibrium:

$$\underbrace{\frac{\partial \sum_{j \in L} \sum_{i \in j} \pi_i(\beta)}{\partial \beta}}_{\text{marginal gain}} = \underbrace{\frac{F}{(1+\beta)} \left(\frac{\sigma}{\sigma - 1} - \frac{1}{(1+\beta)} \right) \left(\sum_{j \in L} \alpha_j + \phi \right)}_{\text{marginal loss}} \tag{23}$$

Therefore, an increase in $\sum_{j \in L} \alpha_j$ or ϕ reduces the equilibrium entry tax, everything else being equal, since they both increase the marginal loss induced for a given β. These effects are those expected since a higher ϕ increases the concern of the government for social welfare. Similarly, a larger $\sum_{j \in L} \alpha_j$ implies that the L lobbies represent a larger share of the total population. The weight of their consumer interest in their objective function is thus larger, and their motivation to get a large β smaller.

Lemma 2 *The equilibrium entry tax β^* is larger, the lower $\sum_{j \in L} \alpha_j$ and ϕ.*

This comparative statics result is very intuitive. Since an entry tax necessarily lowers consumers' surplus, the more the lobbies and the government weigh the interest of consumers, the

less inclined they are to accept a large entry tax. This result does not diverge from the conclusions of GH. However, while the impact of the share of population represented by lobbies is similar on the equilibrium of the political game, it has some distinct features on the competition among lobbies,as we will highlight in the next section.

The definition of the equilibrium entry tax in (22) also shows that if all firms were represented in equilibrium by a lobby, the equilibrium level of entry tax would be $\beta^* = 0$, due to the fact that $\sum_{j\in L}\sum_{i\in j}\Delta\pi_i(\beta) = \sum_{i\in\Theta}\Delta\pi_i(\beta) = 0$, $\forall\beta$.

Therefore, $\sum_{j\in L}\sum_{i\in j}\Delta\pi_i(\beta)$ must be positive for a positive entry tax to be possible. This condition is equivalent to say that large firms must be over-represented by lobbies.

Lemma 3 *The equilibrium entry tax is positive if and only if lobbies are biased towards large firms on aggregate, i.e. only if* $\sum_{j\in L}\sum_{i\in j}\Delta\pi_i(\beta) > 0$.

This result relies on the assumption that a TBT does not improve social welfare, which is the reason why we rather speak about an entry tax. In this set-up, the only motive for lobbying is the profit shifting effect, which has to be positive on aggregate to get a positive entry tax. The introduction of a social positive effect would temperate this result.

Our results may be compared to those of Bombardini (2008). In a set-up similar to GH, she shows that a greater heterogeneity among firms implies *larger contributions*, which results in a greater *effective protection*. It is however worth noticing that in her model, there is a demand for implementing a tariff even absent any firm heterogeneity. In contrast, the incentive to lobby is uniquely based on the presence of heterogeneous firms in our framework. Indeed, if all firms were identical, they would be similarly affected by an additional entry tax. It would therefore be impossible to determine which firms would gain market shares and which firms would be forced to exit. As a consequence, it would be impossible to determine the incentives to lobby for or against a positive entry tax. The presence of heterogeneous firms therefore provides microfoundations for such lobbying.

Proposition 1 *The only incentive to lobby for an entry tax is driven by the presence of heterogeneous firms.*

Firm heterogeneity is here the sole motivation for proposing *positive contributions.* However, it does not mean that the level of *effective protection* would be larger.[12] To see this, note that lobbies with ownership biased towards large firms would contribute for a positive and potentially large entry tax. But lobbies with ownership biased towards small firms would contribute so as to make the entry tax as small as possible. It follows that the level of effective protection only comes from the relative strength of these two groups of lobbies, and nothing ensures that large positive contributions would generate a large effective protection.

Proposition 2 *The level of effective protection is only determined by the bias of active lobbies towards large firms and is independent of the amount of positive contributions.*

It follows that an apparently organized sector (Goldberg and Maggi, 1999, i.e. with large positive contributions according to) in the PFS framework could correspond to a sector with organized lobbies that are biased on aggregate *against* a given policy in our framework. This result is important from an empirical point of view, since the interpretation of the correlation between the positive contributions made by a given sector and its level of protection might be spurious if we consider other policy instruments than tariffs. This is important since empirical studies that have tested the PFS framework use data on NTBs (Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000; **?**; Bombardini, 2008, see) considering this kind of protection as *equivalent* to a tariff, which is shown here to be wrong as soon as at least part of NTBs apply to *all* producers, independently of their nationality.

[12]We interpret the level of effective protection as the level of the entry tax which does not necessarily leads to protect domestic firms from the competition of foreign firms. The last section of this paper discusses the impact of an entry tax on the competition faced by domestic firms from abroad.

5 Competition among lobbies with truthful contribution schedules

As pointed out in the previous section, the equilibrium level of the entry tax is positively related to the aggregate bias of lobbies towards large firms and the bias of the lobbies and the government towards their producer and private interests. However, this equilibrium level remains independent of the total amount of contributions received by the government, so we have *a priori* no clue on the way the surplus of this game is shared. As shown by Laussel and Breton (2001), the share of the surplus captured by the government is the result of the competition among lobbies. In this section, we show that the determinants of competition differ from those of the PFS framework, which results in a different sharing of the surplus.

In order to examine the equilibrium level of contributions, we must make an additional assumption on the shape of the lobbies' contribution schedules. The equilibrium presented in the section 3.3.2 can indeed be supported by many contribution schedules.[13] For a clear comparison with the previous literature, we follow BW and GH and assume that lobbies propose contribution schedules to the government that are all truthful everywhere. This assumption is equivalent to:

$$\frac{\partial C_j(\beta)}{\partial \beta} - \frac{\partial W_j(\beta)}{\partial \beta} = 0 \ \forall \beta \in \Xi \tag{24}$$

As shown by BW and further argued by GH, there are some reasons to focus on such contribution schedules. BW have shown that *"the set of best responses to any strategies played by one's opponents includes a strategy that is truthful"*(GH). Besides, truthful strategies induce equilibria that are stable to non-binding communication among players, i.e. they are "coalition-proof".

The truthfulness of the contribution schedule of any lobby j implies that this lobby chooses its contribution schedule such that:

$$C_j(\beta, B_j) = \max[W_j(\beta) - B_j, 0]$$

[13]The only requirement is that contribution schedules are locally differentiable *around* β^*.

where B_j is a constant and can be interpreted as the net welfare of lobby j whenever this lobby makes a positive contribution to the government in equilibrium. As pointed out by GH, *"the lobby therefore wishes to make B_j as large as possible (and the contribution as small as possible), but without going so far as to induce the government to deviate from p^o [for us β^*] to some alternative policy that might be damaging to its interests"*.[14]

BW have shown that the equilibrium level of each B_j, which ultimately determines how the surplus of the game between the government and the lobbies is shared, is chosen by each lobby j so as to make the government indifferent between the equilibrium entry tax β^* chosen if lobby j is active in the political game and the entry tax chosen by the government if lobby j was not active.

In the latter case, the government chooses an alternative entry tax $\widehat{\beta}$ that maximizes its objective function, with a subset of active lobbies $S \subseteq L$ and $j \notin S$. The government chooses a level of tax entry $\widehat{\beta}$ that maximizes its objective function for each possible coalition of lobbies belonging to the subset S. The contribution of lobby j must be such that the government receives a net payoff if lobby j is active that is at least equal than any net payoff it would get when contracting with any subset of lobbies in S.

Formally, we define $\overline{G_L}(\beta)$ as the highest net payoff the government could get when there is L active lobbies

$$\overline{G_L}(\beta) = \arg\max_{\beta} G_L(\beta)$$

We further define $\overline{\psi}_j \equiv \{S \subseteq L : j \notin S\}$. According to BW, it follows that each lobby j chooses its B_j such that the following equation is verified:

$$\overline{G_L}(\beta) = \max_{S \in \overline{\psi}_j} \overline{G_S}(\beta) \text{ for all } j \in L \tag{25}$$

Contributions of the L lobbies must thus satisfy a system of L simultaneous equations with L unknowns. Laussel and Breton (2001) call these L equations the fundamental equations. They provide a set of theoretical results to identify the structure of equilibrium payoffs (here

[14] In the original quote, B_i replaces B_j.

the B_js and G) in common agency games under complete information. The game we present here is just an application of this more general class of games. Their contribution emphasizes that the surplus of the game captured by the government comes from the competition among lobbies. "*...the agent's rent in this framework is the pure result of conflicting preferences among principals*".

They show that this system has not necessarily a unique vector of solutions, but they also provide a "user guide" to identify the structure of equilibrium payoffs. Hereafter we use some of their results to illustrate the determinants of the competition among lobbies in our framework, which in turn allows to distinguish the impact of lobbying on a tax entry compared to lobbying on a vector of tariffs.

We first present the intuition behind our results by comparing the determinants of the competition between lobbies in the GH framework and in ours.

In the PFS framework, the presence of factors of production specific to each sector together with the assumption that consumers own at most one specific factor leads to the presence of lobby sectors. It follows that these lobbies have different interests *by definition* since each lobby asks for protection in its particular sector. However, the conflicts of interests among active lobbies only comes from a general equilibrium effect induced by their consumer interest, which provides an incentive to lobby for free trade policies (or even subsidies) in all other sectors. As a consequence, lobbies have divergent interests but the rivalry between them only comes from their consumer interests. Their producer interests, while different, are never conflicting. As a result, the possibility that active lobbies represent only a negligible share of the population avoids any conflicts of interests among them and they thus capture all the surplus of the political game. On the other hand, if lobbies represent a non-negligible share of the total population, competition among lobbies necessarily increases with the number of active lobbies (i.e. the number of organized sectors). The two key determinants of competition among lobbies in the PFS framework are thus the share of total population represented by the lobbies and the number of active lobbies. Both increase the degree of rivalry between lobbies and thus the share of the surplus of the game captured by the government.

The aim of the present analysis is to show that those determinants depend on the nature of the endogenous instrument studied by GH.

Our framework only differs from the PFS framework in the endogenous policy instrument chosen. This unique difference however dramatically alters the determinants of competition among lobbies.

Since we consider the incentives to lobby on an entry tax inside a unique sector, the presence of a factor of production specific to this sector cannot help in defining an exogenous divergence of interest among lobbies. The conflicts of interests among them thus do not depend on the number of active lobbies *per se*. Besides, the endogenous instrument of protection simultaneously affects their producer and consumer interests. Therefore, in contrast to the multi-sectoral analysis developed in GH, the producer interest of the lobby is *by construction* in opposition with its consumer interest. Therefore, a larger share of the population represented by the active lobbies does not increase the degree of rivalry among them, and may even weaken it. Competition between lobbies thus only increases through a divergence in the lobbies' producer interests, which only depends on the composition of their ownership.

To foster the intuition behind these new determinants of the degree of rivalry among lobbies, we will develop three illustrative examples.

5.1 An identical ownership composition for all lobbies

We first suppose that the L active lobbies have exactly the same ownership composition and represent an equal share of the total population. Their welfare functions are thus identical and so their contribution schedules. The obvious consequence is that all lobbies have the same preferred entry tax and thus their private interests do not diverge (here we also suppose that their preferred entry tax is positive). There is thus no competition between these lobbies.

To show this result, we use the definition of comonotonicity of a common agency game provided by Laussel and Breton (2001):[15]

[15]The following definition is adapted to our notations.

Definition 1 *A common agency game is comonotonic if, for all* i, $k \in L$, *and all* β_1, $\beta_2 \in \Xi$, $[W_i(\beta_1) - W_i(\beta_2)]\,[W_k(\beta_1) - W_k(\beta_2)] \geq 0$

This property of comonotonicity ensures that the agent is left with no positive rent.[16] In the specific situation where all lobbies are identical, the game is obviously comonotonic, whatever the number of active lobbies. The government therefore cannot capture any surplus. The sum of contributions paid to the government in the equilibrium β^* is thus:

$$\sum_{j \epsilon L} C_j(\beta^*, B_j^*) = \phi\,(W(\beta = 0) - W(\beta^*))$$

As soon as all active lobbies are identical, the government will only be compensated for its welfare loss at β^*. All the surplus of the political game is thus shared between active lobbies.

Proposition 3 *Competition between lobbies does not depend on the number of active lobbies but on the divergence in their private interests.*

In contrast to the GH framework, an increase in the number of active lobbies does not necessarily increase competition among them and thus does not increase the share of the surplus captured by the government. This result, while very intuitive, highlights the fact that the presence of factors specific to sectors cannot help in creating an exogenous divergence of interests among lobbies when we look at an intra-sectoral competition among lobbies.

This result is quite close to those of Pecorino (1998). He indeed shows that the free-riding problem and the difficulty to maintain a cooperative outcome are not increasing in the number of firms in the lobby. Similarly, in our model, competition between lobbies uniquely comes from their conflicting private interests.

5.2 Two lobbies with conflicting producer interests

Consider now a case where we have only two lobbies, labeled l and s. This very simple case allows to get easy solutions to the two fundamental equations. Specifically, we suppose that lobby s

[16] See proposition 4.1 in Laussel and Breton (2001), p106

has an ownership biased towards small firms while lobby l has an ownership biased towards large firms, but as in the previous example, they represent an equal share of the total population (i.e. $\alpha_l = \alpha_s$).

According to (24), the truthfulness of contribution schedules ensures that the shapes of these schedules perfectly capture the evolution of lobbies' welfare with respect to the entry tax. Contribution schedules are thus such that:

$$\begin{aligned}
\frac{\partial C_l(\beta)}{\partial \beta} &= \frac{\partial \sum_{i \in l} \pi_i(\beta)}{\partial \beta} - \alpha_l \frac{\frac{F}{(1+\beta)}\left(\frac{\sigma}{\sigma-1} - \frac{1}{(1+\beta)}\right)}{\partial \beta} \\
\frac{\partial C_s(\beta)}{\partial \beta} &= \frac{\partial \sum_{i \in s} \pi_i(\beta)}{\partial \beta} - \alpha_s \frac{\frac{F}{(1+\beta)}\left(\frac{\sigma}{\sigma-1} - \frac{1}{(1+\beta)}\right)}{\partial \beta}
\end{aligned}$$

The differences in their contribution schedules therefore only come from the differences in their ownership. We further assume that the equilibrium entry tax is positive, meaning that the aggregate ownership composition of these two lobbies is biased towards large firms. We call $\widehat{\beta}_s$ the alternative entry tax that would prevail if lobby l was not active and $\widehat{\beta}_l$ if lobby s was not active. Our assumptions on the ownership composition of each lobby imply that $\widehat{\beta}_l > \beta^* > \widehat{\beta}_s$.

From (25), we derive that $C_l(\beta^*, B_l^*)$ and $C_s(\beta^*, B_s^*)$ are such that:

$$\begin{aligned}
C_l(\beta^*, B_l^*) &= \phi\left(W(\widehat{\beta}_s) - W(\beta^*)\right) + \left(C_s(\widehat{\beta}_s, B_s^*) - C_s(\beta^*, B_s^*)\right) \\
C_s(\beta^*, B_s^*) &= \phi\left(W(\widehat{\beta}_l) - W(\beta^*)\right) + \left(C_l(\widehat{\beta}_l, B_l^*) - C_l(\beta^*, B_l^*)\right)
\end{aligned} \tag{26}$$

The equilibrium contribution of lobby j (with $j = s, l$) must therefore compensate the government for the welfare variation induced by its participation, plus the variation of the other lobby's contribution compared to the situation where lobby j would not have been active. Each lobby thus cannot compensate the government only for its welfare loss. It has to make the government indifferent with the situation where the other lobby is the unique active lobby. As shown by Laussel and Breton (2001), it follows that the government is able to capture a part of the surplus

of this game because lobbies have not the same private interests.[17]

(26) allows to further define the equilibrium level of $C_l(\widehat{\beta}_l, B_l^*)$ and $C_s(\widehat{\beta}_s, B_s^*)$, which defines the outside option of the government in front of lobby j: the equilibrium contributions the government would receive if it neglects the proposal of lobby j. This lobby must make sure that this outside option is not preferred by the government. We get:

$$\begin{aligned} C_l(\widehat{\beta}_l, B_l^*) &= \phi\left(W(\widehat{\beta}_s) - W(\widehat{\beta}_l)\right) + C_s(\widehat{\beta}_s, B_s^*) \\ C_s(\widehat{\beta}_s, B_s^*) &= \phi\left(W(\widehat{\beta}_l) - W(\widehat{\beta}_s)\right) + C_l(\widehat{\beta}_l, B_l^*) \end{aligned}$$

It is immediate that the two outside options of the government are larger, and so the contributions it receives, the larger the gap between $\widehat{\beta}_l$ and $\widehat{\beta}_s$. This only depends on the divergence in lobbies' ownership composition.

Proposition 4 *Competition among lobbies depends on the degree of rivalry between them, illustrated by the gap between $\widehat{\beta}_s$ and $\widehat{\beta}_l$.*

5.3 The role of lobbies' consumer interest

The last important point in this analysis is to shed some light on the impact of lobbies' consumer interest on the equilibrium level of lobbies' contributions.

We have shown that the role of lobbies' consumer interest does not differ from GH on the equilibrium level of the endogenous policy instrument. We would like however to point out that it has a different impact on the equilibrium level of lobbies' contributions. Indeed, in the multi-sectoral analysis developed by GH, competition among lobbies only comes from the fact that their consumer interest are not aligned with the producer interest of the other active lobbies. Therefore, the larger is the share of total population represented by the active lobbies, the fiercer is competition among them.

[17] As an illustration, we can compute the net payoff of the government: $\Delta G = C_l(\beta^*, B_l^*) + C_s(\beta^*, B_s^*) - \phi\left(W(\beta = 0) - W(\beta^*)\right)$, when $\widehat{\beta}_s = 0$. We get $\Delta G = C_s(\beta = 0, B_s^*) > 0$

In our within sectoral analysis, the consumer interest directly conflicts with the producer interest of each lobby. As a consequence, the larger is the share of total population represented in a lobby, the closer to the social objective would be its preferred policy. It follows that an increase in the α_js would bring back the objective of all lobbies towards an equilibrium with $\beta = 0$.

Indeed, an increase in α_j necessarily increases the weight of the consumer part in the objective function of lobby j, which always reduces the slope of its contribution schedule and thus its preferred entry tax.

As shown in the previous example in the case of only two lobbies, competition among them depends on the gap between $\widehat{\beta}_l$, and $\widehat{\beta}_s$. A similar increase in α_l and α_s would decrease similarly $\widehat{\beta}_l$, $\widehat{\beta}_s$ and β^* and thus would not increase the competition among lobbies. Furthermore, as soon as $\widehat{\beta}_s$ reaches 0, a further increase of the α_js would reduce competition by making $\widehat{\beta}_l$ and β^* closer to $\widehat{\beta}_s$. It follows:

Proposition 5 *An increase in the total population represented by active lobbies does not increase competition among them, and may even weaken it.*

6 Discussion

We have so far studied the impact of setting an entry tax in a closed economy framework, where we made no assumptions on the ownership composition of the L exogenous active lobbies. We discuss here the consequences of relaxing these assumptions.

6.1 Small open economy

The framework we have developed throughout this paper could be easily extended to a small open economy framework in line of the PFS model. In this situation, a subset of goods sold in this economy would be produced by foreign suppliers. As mentioned in the introduction, the implementation of a TBT cannot only be applied to foreign suppliers and must also affect

domestic producers. The conflicts of interests between large and small firms thus remain the same independently of firms origin.

A question that necessarily arises in a small open economy framework is to know whether the government is sensitive to foreign lobbies contributions or not. While assuming this is true seems not unrealistic *per se*, we want focus here on the case where the government instead does not take into account foreign lobbies contributions. In this simple situation, a new effect appears in the model: does the implementation of the entry tax reduce or increase the share of total profits earned by foreign suppliers? It is noteworthy that this question is equivalent to ask whether foreign firms are more productive on average than domestic firms. Indeed, if this is true, i.e. foreign firms are larger on average, then they would benefit more than domestic firms from the profit shifting effect induced by an entry tax. The implementation of an entry tax would therefore increase the import penetration ratio.

This is interesting since it means that an increase in TBTs that affects all producers similarly might increase the import penetration ratio, which is at odds with the logic of empirical tests of the PFS framework. Importantly, it follows that the entry tax should be lower in that case, everything else being equal, because the induced profit shifting from small to large firms would also generate a profit shifting from domestic to foreign firms, reducing the share of total profits earned by domestic firms, which is valorized by the government in its objective function. This new effect leads to new considerations when setting up an entry tax or other forms of regulations that affect all producers similarly. The question is not only to know what the import penetration ratio is, which defines the benefits induced by the implemented policy that accrue to domestic producers, but also what the average productivity of foreign suppliers is, i.e. do they benefit more from the profit shifting effect than domestic producers? The level of protection thus does not only depend on the import penetration, but also on the average productivity of foreign suppliers.

6.2 Lobbies' ownership composition

We have also assumed no specific ownership composition for lobbies in our analysis, except for the three examples developed in section 4. This assumption has been motivated by the fact that

the definition of large versus small firms (i.e. $x_C(\beta)$) is endogenous. This assumption also allows to get general results that do not depend on lobbies' ownership composition.

However, one possibility to go through is to consider that each lobby represents the interest of a firm at most. This would further imply, as in Bombardini (2008), that there are factors of production that are specific *to firms* and that consumers cannot hold more than one factor of production. If all firms are organized, all the surplus of the political game is captured by the government, since the conflicts of interests are maximum. In contrast, if we consider that consumers are able to perfectly diversify their portfolio, there would be no competition among lobbies and they would capture all the surplus of this game.

It is however interesting to notice that, as Bombardini (2008) shows, "*both at the industry level and over all sectors, larger firms are more likely to participate in the political game and make larger contributions. The model predicts that larger firms are more likely to take part in the lobby. Making use of firm-level data, I show that this prediction is confirmed.*" Accordingly, large firms are likely to be better organized than small firms, resulting in a larger protection because lobbies would be biased towards large firms. Our theoretical results are thus in line with her findings.

A last but important consideration on lobbies' ownership composition is related to a possible endogenous lobbies' formation, independently of any fixed cost in participating the lobby's activity. As we mentioned earlier, it is not possible to *ex ante* define large versus small firms. However, in international negotiations, countries generally bargain over the adoption of a fixed standard. Therefore, lobbying activity simply consists in supporting or opposing this adoption. If this would have been the case in our game setting, the game would have been necessarily two-sided, inducing two groups of lobbies with comonotonic preferences.[18] In this situation, each firm's owner would be able to *ex ante* know its preferred outcome because the level of the poten-

[18]The definition of a two-sided common agency game is provided by Laussel and Breton (2001):

Definition 2 *A common agency game is two-sided if there exists a partition of L in two sets l and s such that for all β_1, $\beta_2 \in \Xi$: $[W_i(\beta_1) - W_i(\beta_2)]\,[W_k(\beta_1) - W_k(\beta_2)] \geq 0$ if $i, k \in l$ or $i, k \in s$ and $[W_i(\beta_1) - W_i(\beta_2)]\,[W_k(\beta_1) - W_k(\beta_2)] \leq 0$ if $i \in l$ and $k \in s$.*

tial β is known. Each firm would then join the lobby that is most congruent with its interests. The lobbies' composition would then depends on the level of the potential entry tax. It is finally worth noting that the government has an interest in announcing first a precise level of entry tax since this would trigger competition among lobbies, and as a result, would increase the rent captured by the government.

7 Conclusion

The New Political Economy literature has extensively studied the case of tariff negotiations. However a focus on Technical Barriers to Trade is of interest as their importance in governments' trade policies is on the rise. The model developed in this paper adapts the common agency game under complete information pioneered by BW and further extended by GH, to this new policy instrument.

Our results show that the underlying motives for lobbies to influence government's decisions over a level of TBTs largely differ from those that arise over tariffs. We first show that the motives for lobbying to set up TBTs still exist in a closed economy setting, since the lobbying activity over this instrument is motivated by a profit shifting effect. This new instrument thus shifts the competition among active lobbies from an inter-sectoral to an intra-sectoral competition, which leads to give up the "lobby sector" assumption.

While the model developed in this paper mainly relies on a closed economy analysis, we argue that the main qualitative results could be easily extended to a small open economy. This leads to reconsider the determinants of the level of protection, since it is not only influenced negatively by the import penetration ratio in the sector, but also by the average productivity of foreign competitors.

We consider that this paper contributes to clarify the differences between tariffs and TBTs and the differences in the underlying political motives to implement them.

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